

REPORT OF A NEW INTRODUCED SPECIES AND REVISED KEY TO THE ANNUAL *CRASSULA* (CRASSULACEAE) OF CALIFORNIA

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The most recent floristic treatment of *Crassula* of California (Moran 1993) and monograph of the New World annual species of the genus (Bywater and Wickens 1984) recognize four or five species in the state, respectively: *C. aquatica* (L.) Schönl., *C. connata* (Ruiz Lopez & Pavon) A. Berger, *C. saginoides* (Maxim.) Bywater & Wickens, *C. solieri* (C. Gay) F. Meigen, and *C. tillaea* Lester-Garl. Moran (1993) treats *Crassula saginoides* as a synonym of *C. aquatica*. The former four taxa are considered native to California, while the latter is an introduction from the Mediterranean basin (Bywater and Wickens 1984). Additionally, Bywater and Wickens (1984) divide *C. connata* into five varieties, of which four are reported to occur in California: *C. connata* var. *connata*, *C. c.* var. *erectoides* Bywater & Wickens, *C. c.* var. *eremica* (Jepson) Bywater & Wickens, and *C. c.* var. *subsimplax* (S. Watson) Bywater & Wickens. Moran (1993) ignores these varieties entirely. In a general sense, *C. connata* s.l. and *C. tillaea* can be considered plants of terrestrial habitats, while *C. aquatica*, *C. saginoides*, and *C. solieri* are typically associated with aquatic or emergent habitats.

In May of 2002, a local botanist, Bob Muns, brought to my attention an annual *Crassula* he had observed growing in disturbed alluvial scrub along the San Gabriel River near Irwindale, at the base of the San Gabriel Mountains in southern California. Although superficially somewhat similar to *C. connata* s.l. in overall habit, the plants in question were uniformly more robust than co-occurring individuals of *C. connata*. Muns subsequently collected fruiting specimens of the unidentified *Crassula*, and these I compared with descriptions in a number of monographic and floristic references from various arid, semiarid, and Mediterranean-climate regions of the world (e.g., Burbidge and Gray 1970; Toelken 1977; 1981; 1983; Stanley and Ross 1983; Jessop and Toelken 1986; Marchant et al. 1987), as well as with specimens housed at RSA-POM. Muns' plants bore greatest similarity to *C. sieberiana* (Schultes & Schultes f.) Druce from Australia, but also shared characters with *C. thunbergiana* J. A. Schultes, *C. campestris* (Eckl. & Zeyh.) Endl. ex Walp., *C. colorata* (Nees) Ostenf., and *C. exserta* (Reader) Ostenf. *Crassula thunbergiana* and *C. campestris* are native to southern Africa, though the former is introduced in Western Australia, while *C. colorata* and *C. exserta* are en-

demically to southern Australia (Toelken 1977, 1981, 1983). Duplicate specimens were sent to H. R. Toelken in Adelaide, South Australia, who promptly replied that the plants were consistent with *C. colligata* Toelken subsp. *lamprosperma* Toelken, an Australian taxon, one of several he had recently segregated from *C. sieberiana* s.l. (Toelken 2002, personal communication).

Crassula colligata subsp. *lamprosperma* is known from sandy to loamy soils in open woodlands, or rarely on shallow soils on or about rock outcrops, in most coastal and subcoastal areas of South Australia into adjacent areas of Victoria and Western Australia (Toelken 2002). How this taxon came to be established on disturbed alluvial terraces along the San Gabriel River in southern California remains a mystery, though I suspect one possibility could be as a contaminant in seed mix used for erosion control at the adjacent sand and gravel quarry.

At the San Gabriel River site, *C. colligata* subsp. *lamprosperma* is established over an area of at least 1–2 ha., though it is abundant in only a few local patches. Relative to *C. connata*, which is common in this area, *C. colligata* subsp. *lamprosperma* appears to favor more mesic, and disturbed microsites. In this regard it is similar to *C. tillaea*, which is also present at this site. Although it is unlikely that *C. colligata* subsp. *lamprosperma* will become a weed of significant economic or ecologic consequence, it should nevertheless be sought in other areas of California. The following key to the annual species of *Crassula* in California is provided to facilitate the effort.

1. Flowers gen. 2 per node; sepals \geq petals, tip pointed; seeds (1)–2 per carpel; plants \pm terrestrial, plants gen. not growing as submerged or emergent aquatics 2
- 1' Flowers 1 per node; sepals \pm $\frac{1}{2}$ petal length, tip rounded; seeds \geq 3 per carpel; plants gen. growing as submerged or emergent aquatics . . . *C. aquatica* (incl. *C. saginoides*), *C. solieri*
2. Flowers gen. 3-merous, \pm subsessile, pedicels \ll 1.5 mm *C. tillaea*
- 2' Flowers gen. 4–5-merous, pedicels gen. $>$ 1.5 mm 3
3. Flowers gen. 5-merous; leaves gen. 4–5 mm long, \pm 1.5 mm wide, apex with short awn or mucro; sepals lanceolate, $>$ 1.5 mm long; petals lanceolate, \pm 1.2 mm long *C. colligata* subsp. *lamprosperma*

3. Flowers gen. 4-merous, leaves gen. < 4 mm long, < 1.5 mm wide, apex acute but lacking short awn or mucro; sepals triangular, < 1.5 mm long; petals narrowly triangular, < 1.2 mm long
 *C. connata* s.l.

Representative specimens of *Crassula colligata* subsp. *lamprosperma*: Los Angeles Co., CA. Transverse Ranges, San Gabriel Mountains Region; Santa Fe Dam Recreation Area, old San Gabriel River floodplain, on side of road leading to the Lario San Gabriel River Trail parking area, just north of Foothill Blvd. in the city of Irwindale. 28 May 2002, *B. Muns* s.n. (RSA, UCR, UC); Los Angeles Basin region, Vicinity of Irwindale east of the San Gabriel River and west of gravel pits, just north of Foothill Blvd, ca. 600 meters west of Irwindale Ave., near 34°8'8.8"N 117°56'19.5"W, elev. 177 m, 17 Jan 2003. *S. Boyd* 10441 (RSA, CAS).

LITERATURE CITED

- BURBIDGE, N. T. AND M. GRAY. 1970. Flora of the Australian Capital Territory. Australian National University Press, Canberra, Australia.
- BYWATER, M. AND G. E. WICKENS. 1984. New World species of the genus *Crassula*. Kew Bulletin 39:699–728.
- JESSOP, J. P. AND H. R. TOELKEN. 1986. Flora of South Australia, pt. 1. Lycopodiaceae–Rosaceae. South Australian Government Printing Division, Adelaide, Australia.
- MARCHANT, N. G., J. R. WHEELER, B. L. RYE, E. M. BENNETT, N. S. LANDER, AND T. D. MACFARLANE. 1987. Flora of the Perth region (Part One). Western Australian Herbarium, Dept. of Agriculture, Western Australia, Perth, Australia.
- MORAN, R. 1993. *Crassula*. Pp. 525 in J. C. Hickman (ed.), The Jepson manual: higher plants of California. University of California Press, Berkeley, CA.
- STANLEY, T. D. AND E. M. ROSS. 1983. Flora of southeastern Queensland (Volume 1). Queensland Department of Primary Industries Miscellaneous Publication 8120. Queensland Department of Primary Industries, Brisbane, Australia.
- TOELKEN, H. R. 1977. A revision of the genus *Crassula* in Southern Africa. Contributions to the Bolus Herbarium 8:1–595.
- . 1981. The species of *Crassula* L. in Australia. Journal of the Adelaide Botanic Garden 3:57–90.
- . 1983. Additions to 'The species of *Crassula* L. in Australia'. Journal of the Adelaide Botanic Garden 6:193–196.
- . 2002. The annual taxa of the *Crassula sieberiana* complex in South Australia. South Australian Naturalist 76:4–13.